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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,622	08/08/2001	Chung-Yen Lu	39524.0600	3157
20322	7590	07/02/2004	EXAMINER	
SNELL & WILMER ONE ARIZONA CENTER 400 EAST VAN BUREN PHOENIX, AZ 850040001			HUNG, YUBIN	
			ART UNIT	PAPER NUMBER
			2625	2

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/924,622	LU, CHUNG-YEN	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

- P. 2, line 12: "H=60" should have been "H=0"

Appropriate correction is required.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al. (US 5,883,984).

3. Regarding claim 1, and similarly claim 8, Huang et al. discloses

- (a) determining a reference value X;
(b) subtracting X from said three components (R, G, B) to obtain values of (R-X), (G-X) and (B-X);
(c) respectively obtaining three scaled components (Rs, Gs, Bs) by scaling (R-X), (G-X) and (B-X) using scale factor S; and
(d) respectively adding three scaled components (Rs, Gs, Bs) to said three components (R, G, B) to generate three enhanced components [Fig. 10, numerals 3, 22; Fig. 11; Col. 4, Eqs. (8) - (10); Col. 6, line 62 - Col. 7, line 15. Note that by substituting X for Mean_I and S for (Contrast_Enhancement_Gain - 1) in the equations the following are obtained:
$$\text{Enhanced_R} = R + S \cdot (R - X)$$
$$\text{Enhanced_G} = G + S \cdot (G - X)$$
$$\text{Enhanced_B} = B + S \cdot (B - X)$$

]

4. Regarding claim 6, Huang et al. also discloses

- said scaling step is performed by operations of $S^*(R-X)$, $S^*(G-X)$ and $S^*(B-X)$
[Per the analysis of claim 1]

Claim Rejections - 35 USC § 103

5. Claims 2-5, 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (US 5,883,984).

6. Regarding claim 2, and similarly claims 3-5 and 9-12, Huang et al. discloses all the limitations of its parent claim.

In addition, Huang et al. discloses using the mean intensity value as the value of X [Col. 3, equation (3); Col. 4, lines 49-51 and equations (8) – (10). Note that clearly this mean intensity is within the range of R, G and B values].

Huang et al. does not expressly disclose using the minimum value of R, G and B (namely, $\min(R,G,B)$) as the value of X.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Huang et al. by using $\min(R,G,B)$ as the value of X. Applicant has not disclosed that using $\min(R,G,B)$ as the value of X provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art,

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furthermore, would have expected Applicant's invention to perform equally well with using the mean intensity value as the value of X because as shown in P. 6, last line and P. 7, line 10 of the Application, as long as X is greater than zero then it is ensured that the saturation is enhanced while the hue is kept unchanged.

Therefore, it would have been obvious to one of ordinary skill in this art to modify Huang et al. to obtain the invention as specified in claim 2.

7. Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (US 5,883,984) as applied to claims 1, 6 and 8 above, and further in view of Barkans et al. (US 5,905,504).

8. Regarding claim 7, and similarly claim 13, Huang et al. discloses everything except the following, which Barkans et al. teaches

- a clamping operation, after the step (d), over said three enhanced components
[Fig. 4, numeral 86; Col. 9, lines 4-10. Note that the C_{val} in Fig. 4 is any of R, G or B (Col. 6, lines 57-58)]

Huang et al. and Barkans et al. are combinable because they are from the same field of endeavor of image enhancement.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Huang et al. with the teachings of Barkans et al. by clamping the modified

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color values. The motivation would have been to ensure that the values fall within a predetermined color range, as stated in [Barkans et al., Col. 9, lines 7-8].

Therefore, it would have been obvious to combine Barkans et al. with Huang et al. to obtain the invention specified in claim 7.

Allowable Subject Matter

9. Claim 14 is allowed.

10. The following is a statement of reasons for the indication of allowable subject matter:

11. Regarding claim 14, the prior art of record fails to teach or suggest, alone or in combination, an apparatus for enhancing pixel color comprising, along with other limitations:

- a first multiplexer circuitry, coupled to the first circuitry and responsive to a first selection signal, for selectively outputting two values of $(R-G)$, $(G-B)$ and $(B-R)$ according to a first predetermined manner
- a multiplier circuitry, coupled to the first multiplexer circuitry, for selectively generating two scaled values of $S*(R-G)$, $S*(G-B)$ and $S*(B-R)$, wherein S is a predetermined scale factor
- a second multiplexer circuitry, coupled to the multiplier circuitry and responsive to a second selection signal, for selectively outputting the $S*(R-G)$, $S*(G-B)$ and $S*(B-R)$
- an AND logic circuitry, coupled to the second multiplexer circuitry and responsive to a first control signal, for selectively outputting a set

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signal of $(S*(B-R), S*(G-B), 0), (S*(R-G), 0, S*(G-B))$ and $(0, S*(R-G), S*(B-R))$

- an arithmetic circuitry, coupled to the AND logic circuitry and inputting the three components (R, G, B) , for selectively outputting an enhanced color components of $(R+S*(R-B), G+S*(G-B), B), (R+S*(R-G), G, B+S*(B-G))$ and $(R, G+S*(G-R), B+S*(B-R))$, responsive to a second control signal

The closest arts of record, Yoshida (JP 2001-054132 A) discloses an apparatus that has a circuitry [Fig. 2, numerals 101-103] for calculating and outputting $(R-G), (G-B)$ and $(B-R)$, a multiplier circuitry [Fig. 2, numerals 111-113] for computing $S*(R-G), S*(G-B)$ and $S*(B-R)$ and an arithmetic circuitry [Fig. 2, numerals 117-119] for computing $R+S*(R-G), G+S*(G-B)$, and $B+S*(B-R)$. However, it does not have the two multiplexer and the one AND circuitry recited in the claim, nor does its multiplier and arithmetic circuitries perform all the functions (such as the selectivity or the calculation of $R+S*(R-B)$, among others).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are listed below:

- US 5,548,697 (Zortea) – Describes a color correction device that calculates as color adjustments scaled color difference for each color component $(R, G, \text{ or } B)$
- US 5,016,173 and US 5,241,468 (both by Kenet et al.) – Describes an apparatus and method that increases saturation while keeping the hue value

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(US 5,241,468) using the same color adjustment value ($\min(R,G,B)$) for each of the color components (US 5,016,173)

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
June 25, 2004



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